**Antibiotic Resistance**

Answer T (true) or F (false) for each question. Use BLUE for before the video. Use GREEN to correct your answers after watching the video.

* Bacteria are tiny, single-celled organisms.
* Bacteria do not have a nucleus.
* There is only one type of bacteria.
* Bacteria are only found in our bodies.
* Bacteria can cause infections and illnesses.
* Bacteria are always harmful.
* A single bacterium can reproduce and give rise to five billion trillion bacteria in a single day.
* Bacteria can be passed from person to person by a handshake.
* Antibiotics are substances that control the growth of bacteria.
* Antibiotics can be used to treat infections, pneumonia, flu, and colds.
* There are many different types of antibiotics.
* If a bacterium becomes resistant to one type of antibiotic, it is resistant to all types.
* Antibiotic resistance can develop due to repeated exposure to antibiotics.
* Antibiotic resistance can be inherited.
* Antibiotic resistance can be passed from one bacterium to another through the exchange of bacterial DNA.

**A. How do bacteria reproduce?**

A Demonstration on the Rate of Bacterial Reproduction.

|  |  |  |
| --- | --- | --- |
|  | **Daily Total** | |
|  | **$10 a day** | **1¢ first day, doubled each following day** |
| **Day 1** |  |  |
| **Day 2** |  |  |
| **Day 3** |  |  |
| **Day 4** |  |  |
| **Days 5–29** |  |  |
| **Day 30** |  |  |

Remember that bacteria reproduce by doubling, using a process called *binary fission,* termed **exponential growth.**

1. How fast could a single bacterium develop into 5,368,709 new bacteria if each offspring divided every minute and none died?
2. Why don’t bacteria take over the world at this rate of reproduction?

**B. Watch the video, Killer Microbe**

[**http://www.pbs.org/wgbh/nova/body/killer-microbe.html**](http://www.pbs.org/wgbh/nova/body/killer-microbe.html)

**AFTER THE VIDEO**

**Read “*Acinetobacter baumanii*, Iraqibacter”**

1. Where were the *A baumanii* coming from?
2. Why is *A. baumanii* a problem here in the U.S?

**C. The Development Multi-drug Resistant Bacteria**

Watch the animation on bacterial conjugation. <http://www.hhmi.org/biointeractive/bacterial-conjugation>

**Read: Antibiotic Resistance**

1. How is A. baumanii acquiring its multi-drug resistance?

**The Arms Race with a Superbug Timeline**

<http://www.pbs.org/wgbh/nova/sciencenow/0303/04-arms-nf.html>

1. What do you notice from the timeline between the development of a new antibiotic and the first reported incidence of resistance?
2. How long did it take for *S. aureus* to become completely resistant to vancomycin?

**Tuberculosis**

**We will watch the video “Why Does Evolution Matter Now” together.**

1. Why is multi-drug resistant *M. tuberculosis* a problem in Russia?
2. How does this affect us here in the US?
3. Explain why evolution does matter.

**You and your partner will create a public health pamphlet or advertising slogan and campaign to alert the public about the potential problems caused by the overuse of antibiotics.**

* Explain that antibiotic resistance is often a result of overuse and misuse of antibiotics.
* Include how hospitals and clinics play a role in creating antibiotic-resistant strains of bacteria.
* Include one example organism and the preventative measures that people can follow to avoid infection.